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(54) **COLD FIELD ELECTRON EMITTERS BASED ON SILICON CARBIDE STRUCTURES**

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(57) **ABSTRACT**

A cold cathode field emission electron source capable of emission at levels comparable to thermal sources is described. Emission in excess of 6 A/cm^2 at 7.5 V/μm is demonstrated in a macroscopic emitter array. The emitter is comprised of a monolithic and rigid porous semiconductor nanostructure with uniformly distributed emission sites, and is fabricated through a room temperature process which allows for control of emission properties. These electron sources can be used in a wide range of applications, including microwave electronics and x-ray imaging for medicine and security.